

# technetix

## AIMA3000.RT5S

1550 nm Return Transmitter - Standard

### Product User Manual



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## Contents

<b>1</b>	<b>About This Manual</b>	<b>5</b>
1.1	Chapter Overview	5
1.2	Related Documentation	5
1.3	Document Conventions	6
1.4	Technical Support	6
<b>2</b>	<b>Precautions</b>	<b>7</b>
<b>3</b>	<b>Overview</b>	<b>8</b>
3.1	Product Description	8
3.2	Product Key Features	9
3.3	Specifications	10
3.4	Block Diagram	12
3.5	Order Details	13
<b>4</b>	<b>Module Characteristics</b>	<b>14</b>
4.1	Module Appearance and Port Layout	14
4.1.1	Overview	14
4.1.2	Front Panel Layout	15
4.1.3	Rear Panel Layout	17
<b>5</b>	<b>Installation</b>	<b>19</b>
5.1	Preparatory Work for Installation	19
5.2	Unpacking	19
5.3	Module Installation	20
5.4	Connecting Optical Cables	21
5.4.1	Using the Sliding Fibre Guide	21
5.4.2	Using the Fibre Tray	24
5.4.3	Cleaning the Fibre Connector Ends and Front-panel Optical Ports	26
5.4.4	Connecting the Optical Fibres	27
5.5	Check Module LEDs	27
5.6	Test the RF Input Signal	27

5.7	Test the Optical Output Signal.....	27
5.8	RT5S Initial Setup.....	29
<b>6</b>	<b>Module Configuration &amp; Alarm setup.....</b>	<b>32</b>
6.1	Alarms Monitoring .....	32
6.1.1	Alarm Status Pages .....	32
6.1.2	Module operating voltage and temperature alarm .....	33
6.1.3	Module Port Alarms.....	34
6.1.4	Alarm Monitoring Configuration.....	35
6.1.5	Input / Output Status Monitoring.....	36
6.2	Logs Management.....	39
6.3	Device Upgrade.....	40
6.4	Restoring Factory Defaults .....	41
6.5	Reboot.....	43
<b>7</b>	<b>Troubleshooting.....</b>	<b>44</b>
<b>8</b>	<b>Declaration of Conformity .....</b>	<b>46</b>
	<b>Appendix A: Default Alarm Limit Settings .....</b>	<b>47</b>

# 1 About This Manual

## 1.1 Chapter Overview

1. About This Manual: Preface
2. Precautions
3. Overview: Application module overview, including the module features, technical specifications, and ordering information.
4. Module Characteristics: The appearance of the equipment, port and introduction of other components
5. Installation: Installation procedure
6. Module Configuration & Alarms: Web management configuration instructions.
7. Troubleshooting
8. Product Warranty
9. Declaration of Conformity.

Appendix A: Default Alarm Limit Parameters

Appendix B: Factory Default Settings

## 1.2 Related Documentation

The following documents may be used in conjunction with this manual:

- Technetix.AIMA3000 - Product User Manual
- Technetix.AIMA ASMM - Product User Manual
- AIMA3000 NMS Web Management System Product User Manual
- Technetix.NMS3-EPSM - Basic Inventory Management
- Technetix.NMS3-EPSM - Basic Alarm Management
- Technetix.NMS3-EPSM - Basic System Management
- Technetix.NMS3-EPSM - Basic Template Management

### 1.3 Document Conventions

Before you use the manual, please familiarise yourself with the format used in this manual.

‘\*’ Asterisk: Points marked with an asterisk means there is a corresponding note on the page

### 1.4 Technical Support

If you need help in the process of setting up and maintaining an RT5S, please contact Technetix’s technical support staff:

#### Europe:

Technetix BV  
Kazemat 5  
NL-3905 NR Veenendaal  
P.O. Box 385  
NL-3900 AJ Veenendaal  
The Netherlands

Phone: +31 318 58 59 59

Email: [customer.service.vdl@technetix.com](mailto:customer.service.vdl@technetix.com)

## 2 Precautions



### WARNING!

**This equipment is intended for indoor applications. To prevent fire or electrical shock, or damage to the equipment, do not expose units to water or moisture.**

- You should carefully read and thoroughly understand the contents of the manual before installing and using this equipment.
- A typical connector is the SC/APC 8°. Note: An 8 ° angle polished optical connectors must be used.
- At any time, there may be dangerous voltage inside the device.
- DO NOT power up before the cover and the panels of the equipment are installed and the enclosure is closed.

### Cleaning

Only use a damp cloth for cleaning the front panel. Use a soft dry cloth to clean the top of the unit. **DO NOT** use any spray cleaners or chemicals of any kind.

### Outage or overload requiring service and repairs

Unplug the unit and refer the servicing to Technetix qualified service personnel only.

### Servicing and repairs

**DO NOT** attempt to service this unit yourself. Refer all servicing needs to Technetix qualified service personnel only.



### WARNING!

**Exposure to class 3A laser radiation is possible. Access should be restricted to trained personnel only. Do not view exposed fibre or connector ends when handling optical equipment.**

## 3 Overview

### 3.1 Product Description

The RT5S, 1550 nm Return Transmitter - Standard series, is a high-density module with one or two lasers. It is designed to plug into Technetix's latest Advanced Intelligent Multi-services Access platform - the AIMA3000. Technetix RT5S is currently available in either a single or dual transmitter configuration. It features a full-spectrum advanced return path transmitter designed for multi-service operators (MSOs) to increase network capacity to satisfy an ever-growing subscriber demand for bandwidth. The module's operating wavelength conforms to ITU standards and it can work with Technetix Erbium Doped Fibre Amplifier Module (EDFA). It provides the utmost flexibility for MSOs during the transition to all-digital.

The RT5S employs an advanced RF circuit design and is available with either one or two high quality independent low-chirp lasers. In addition, it has a cutting-edge optoelectronic design for the delivery of high-quality transmissions, over passive fibre optic networks.

All RT5S models can also be conveniently monitored and controlled through a computer connected to one of the Ethernet ports via the ASMM module. All module settings are retained in non-volatile memory to ensure trouble-free operation. Bulk updating, automatic uploading and Block Diagram downloading of configuration files can be done when using Technetix NMSE web-based management system.



### 3.2 Product Key Features

- Plug-and-play with the AIMA3000 platform
- High-quality 1550 nm isolated low-chirp analogue DFB lasers
- RF amplifier gain blocks with advanced GaAs technology for better performance
- Conforms to ITU DWDM standards
- Frequency response of 5 MHz to 204 MHz
- Local laser shutdown via web interface
- Totally independent and controllable circuits in one module slot
- Alarm monitoring via ASMM web interface and Technetix NMSE
- Automatic thermo-cooler control (ATC) for a consistent laser temperature
- Automatic power control (APC) for maintaining a consistent amount of power amplification for each wavelength
- Remote firmware upgrade and auto upload/download of configuration files through the ASMM web interface or using Technetix NMSE
- Bulk firmware updates through Technetix NMSE
- Fully FCC, CE and RCM <sup>(1)</sup> compliant

(1) See Declaration of Conformity for current status.

### 3.3 Specifications

#### Optical Performance

Optical wavelength	ITU standard wavelength
Optical outputs	1 or 2
Output power	8 dBm, 9 dBm, 10 dBm
Optical connector	SC/APC (1), LC/APC, FC/APC, E2000/APC
Laser RIN	< -155 dB/Hz

#### RF Performance

RF bandwidth	5 MHz to 204 MHz
RF flatness	± 0.5 dB
RF input return loss	> 18 dB
RF nominal input level (2)	15 ~25 dBmV per channel
RF impedance	75 Ω
RF test point relative to RF input port	-20 ±1 dB
Isolation between Transmitters	> 60 dB
RF inputs connectors	Single: 1 x GSK-type female Dual: 2 x GSK-type female
RF test points	Single: 2 x Mini-SMB (3) Dual: 4 x Mini-SMB(4)
Alarms and laser status	Front-panel LEDs, SNMP traps

#### Link Performance (5)

CNR	> 53 dB
IMD2	< -60 dBc

#### General

Power supply	Powered via AIMA3000 backplane
Power consumption	Single: < 8.0 W Dual: < 15.0 W
Operating temperature	-5 ~ +55 oC
Operating humidity	90 % (Non-condensing)
Storage temperature	-25 ~ +70 oC
Storage humidity	90 % (Non-condensing)
Dimensions (W*D*H)	24.6 mm * 410 mm * 152.5 mm
Weight	0.88 kg
Network management	Technetix NMSE or through ASMM's web interface

**Notes:**

- (1) Standard option. Contact a Technetix Sales Representative for availability of other options.
- (2)  $\text{dBuV} = 60 + \text{dBmV}$
- (3) Two mini-SMB connectors on front panel: 1 RF inputs test ports and 1 to measure RF input before the laser.
- (4) Four mini-SMB connectors on front panel: 2 RF inputs test ports and 2 to measure RF input before the laser.
- (5) Measured in a typical system with 4 channels signal source (11.5 MHz, 26.5 MHz, 45.5 MHz and 58.5 MHz), -2 dBm, 6 % OMI, 10 km fibre. IMD2 is measured at 15 MHz and 38 MHz.

### 3.4 Block Diagram

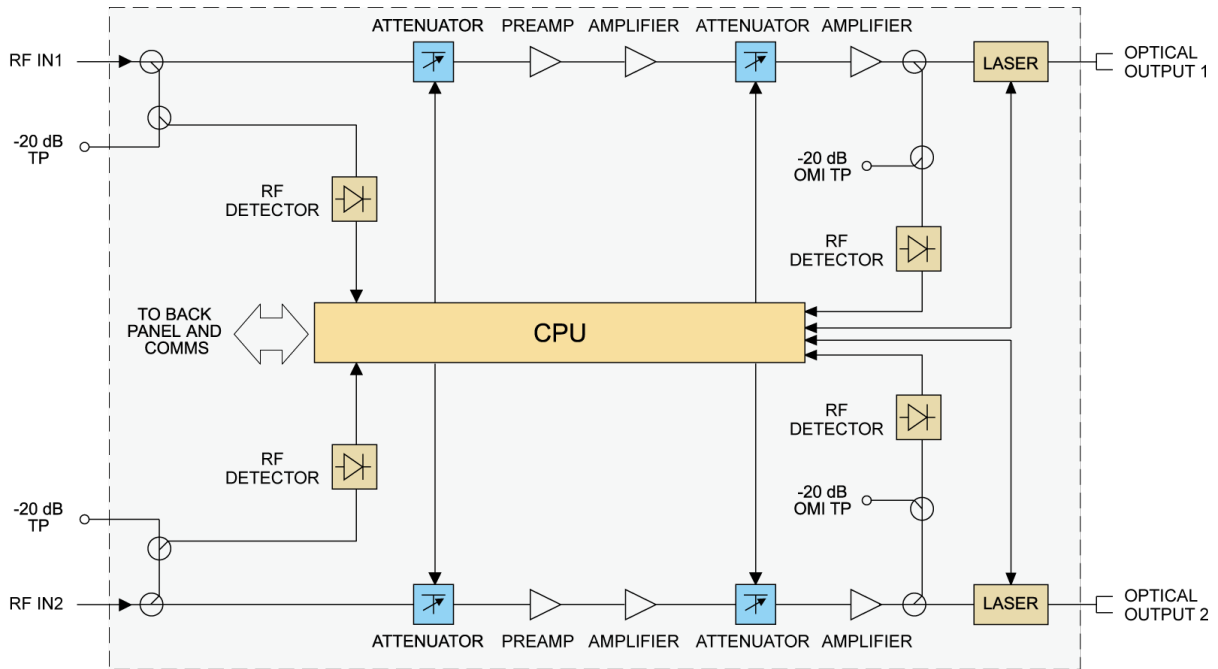


Figure 3.1

Table 3 1 RT5S Block Diagram Glossary

Parameters	Glossary
RF IN 1	RF1 Input
RF IN 2	RF2 Input
-20 dB TP	-20 dB Test Point
PREAMP	Preamplifier Module
AMPLIFIER	Amplifier Module
ATTENUATOR	Gain Adjustment
RF DETECTOR	RF Level Detector
LASER	Laser
OPTICAL OUTPUT	Optical Output
TO BACK PLANE AND COMMS	Data Bus
-20 dB OMI TP	OMI Test Point for Laser
CPU	Central Processing Unit

### 3.5 Order Details

A-RT5S-[V]-[W]-[X1X2]-[Y]-[Z]

1550 nm Return Transmitter - Standard

#### Options:

<b>V</b>	Optical Ports	
	<b>S</b>	Single
	<b>D</b>	Dual
<b>W</b>	Optical Output Power	
	<b>08</b>	8 dBm (6.3 mW) optical power
	<b>09</b>	9 dBm (8 mW) optical power
	<b>10</b>	10 dBm (10 mW) optical power
<b>X1X2</b> <sup>(1)(2)</sup>	First Channel	Last channel
	<b>21</b>	192.1 THz (1560.61 nm)
	<b>23</b>	192.3 THz (1558.98 nm)
	<b>25</b>	192.5 THz (1557.36 nm)
	<b>27</b>	192.7 THz (1555.75 nm)
	<b>29</b>	192.9 THz (1554.13 nm)
	<b>31</b>	193.1 THz (1552.52 nm)
	<b>33</b>	193.3 THz (1550.92 nm)
	<b>35</b>	193.5 THz (1549.32 nm)
	...	...
	<b>51</b>	195.1 THz (1536.61 nm)
<b>Y</b>	Optical Connector Type	
	<b>S</b>	SC/APC (3)
	<b>L</b>	LC/APC
	<b>F</b>	FC/APC
	<b>E</b>	E2000/APC
<b>Z</b>	Bandwidth	
	<b>20</b>	5~204 MHz

(1) Default spacing is 200 GHz. For other wavelength configurations not listed, please contact Technetix.

(2) X2 is only used in dual transmitter variants.

- Dual version, X1 is the first channel and X2 is the second channel

Examples:

Single	X1	25
Dual	X1X2	2527

(3) Standard option. Contact a Technetix Sales Representative for availability of other options.

## 4 Module Characteristics

### 4.1 Module Appearance and Port Layout

#### 4.1.1 Overview

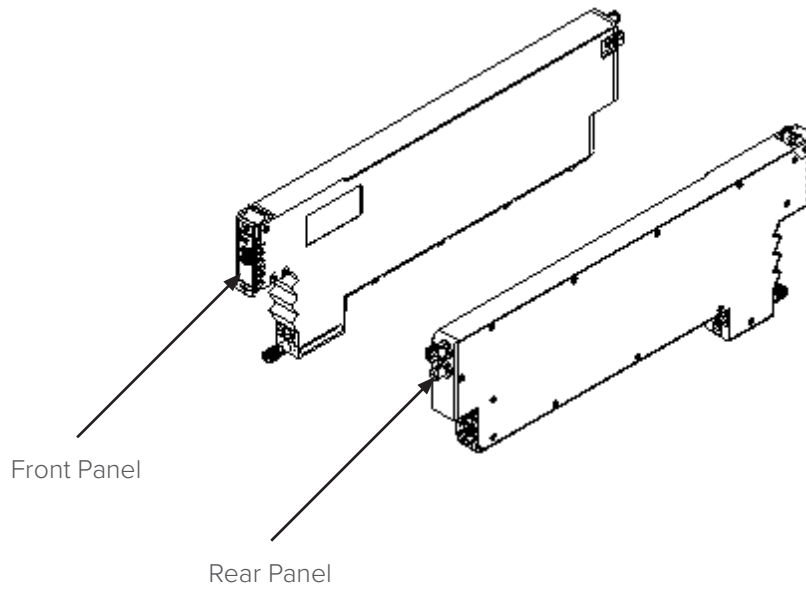


Figure 4.1 Module Appearance

4.1.2 Front Panel Layout

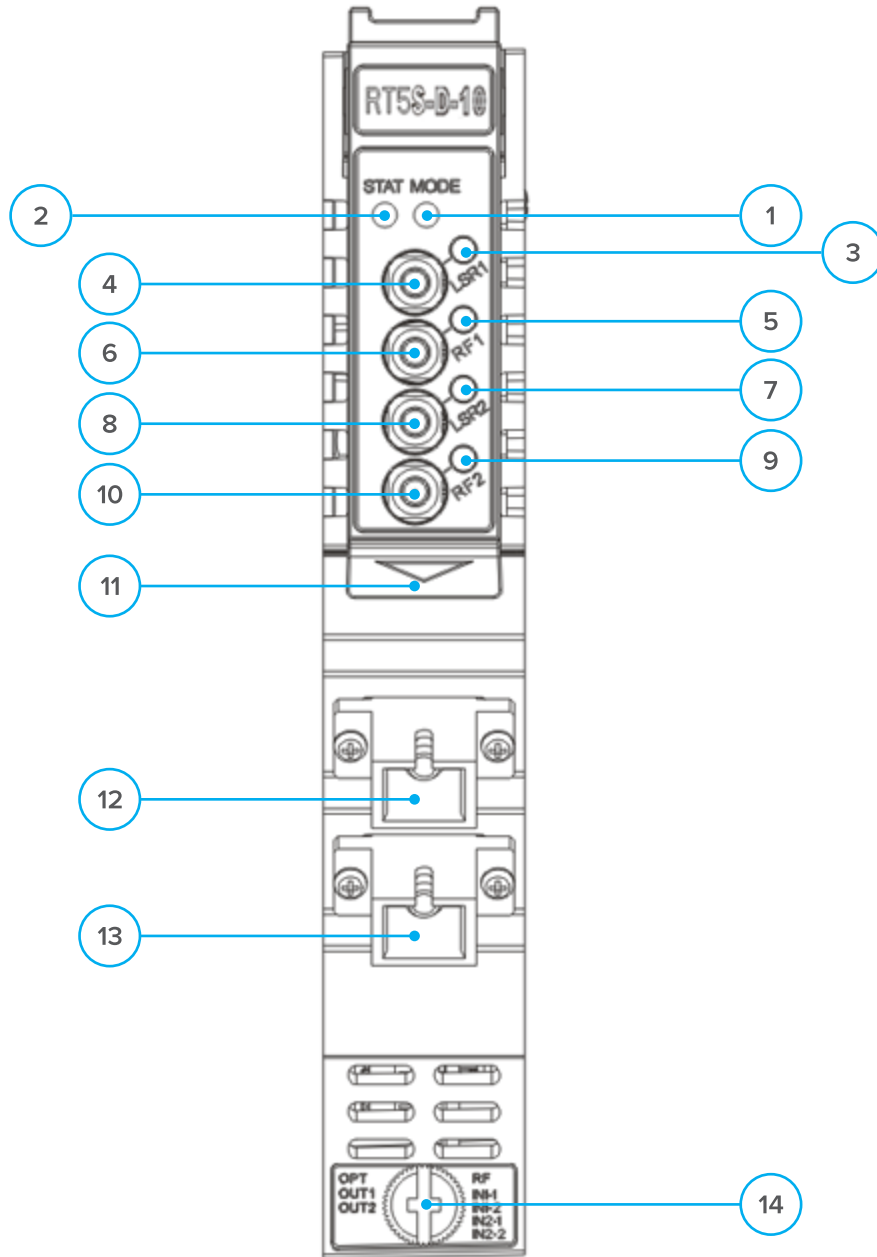


Figure 4.2 RT5S Front Panel Layout

Table 4.1 RT5S Front Panel Functions

Item Number	Item	Description
1	MODE LED	Module Gain Control Mode Indicator MGC: Green Light Blinking AGC: Green
2	STATUS LED	Module Alarm Indicator Normal: Green Minor Alarm: Amber Major Alarm: Red
3	LSR1 LED	Laser Status Indicator Normal: Green OFF: Green Light Blinking Major Alarm: Red
4	LSR1-TP	Laser 1 Input Test Point
5	RF1 LED	RF1 Status Indicator Normal: Green Input RF minor alarm: Amber Input RF level major alarm: Red
6	RF1-TP	RF1 Test Point
7	LSR2 LED	Laser Status Indicator Normal: Green OFF: Green Light Blinking Major Alarm: Red
8	LSR2-TP	Laser 2 level input test point
9	RF2 LED	RF2 Status Indicator Normal: Green Output RF level minor alarm: Amber Output RF level major alarm: Red
10	RF2-TP	RF2 Test Point
11	Orange tab-retaining clip	Used to plug and anchor the module  The tab-retaining clip will pop-up after pressing the release and plug module.
12	OPT OUT 1	Optical output 1
13	OPT OUT 2	Optical output 2
14	Mounting Screw	Module fastening screw

**CAUTION!**

“OPT OUT” emits a non-visible laser radiation when working.



### 4.1.3 Rear Panel Layout

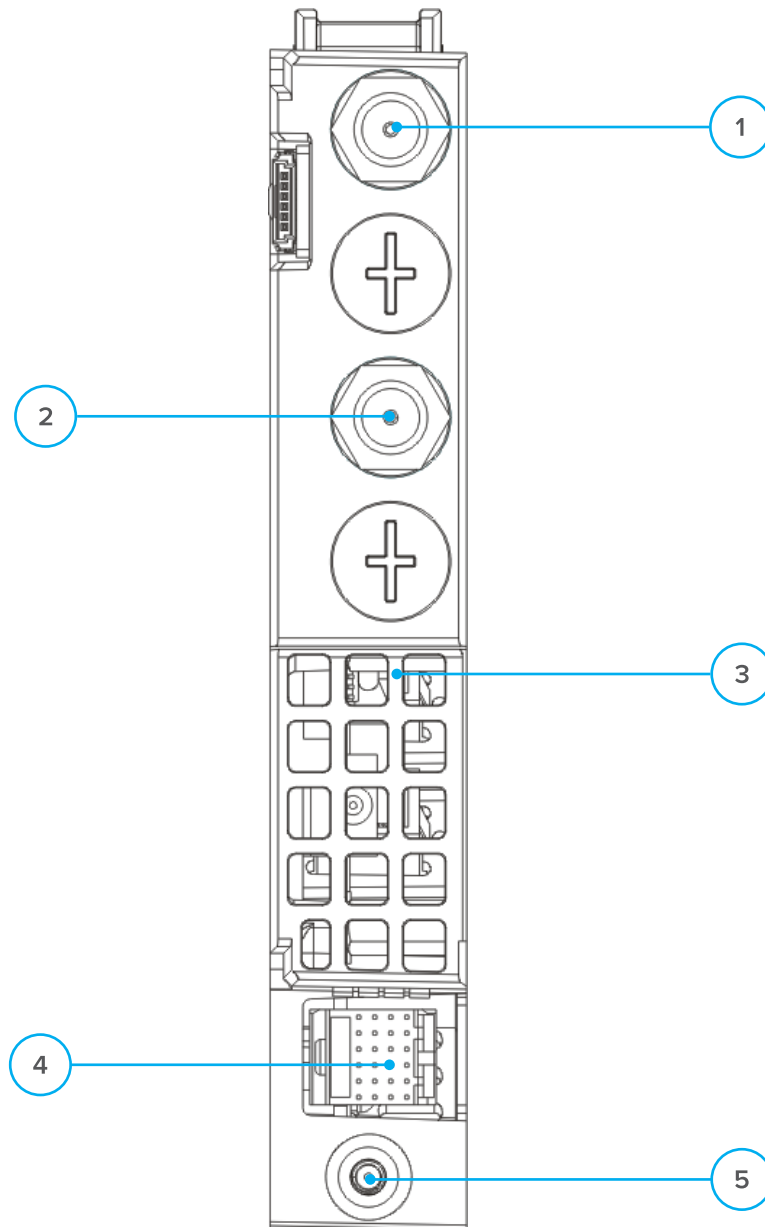


Figure 4.3 Rear Panel Layout

Table 4 2 RT5S Rear Panel Functions

Serial Number	Item	Description
1	RF 1 IN	RF 1 Input
2	RF 2 IN	RF 2 Input
3	Air Vent	Air vent allowing air to flow out of the module
4	Multi-pin Connector	Power and communication port
5	Placement Pin	Used to position the module in the chassis

## 5 Installation

### 5.1 Preparatory Work for Installation

Before installing this device, you must ensure that the unit is intact and ready for installation.

Unpack and check the unit: Open the box to check for any damage that may have occurred during shipment.

If damage is found, please contact a Technetix customer support representative.

**Necessary equipment and tools for installation:**

**Table 5.1 Necessary equipment and tools for installation**

Tools/Modules	Description
Phillips screwdriver PH1/PH2	For use with the AIMA3000 chassis
RT5S Module	The module to install into the AIMA3000 chassis

### 5.2 Unpacking

Unpack the module. Keep the packaging materials for future transport needs.

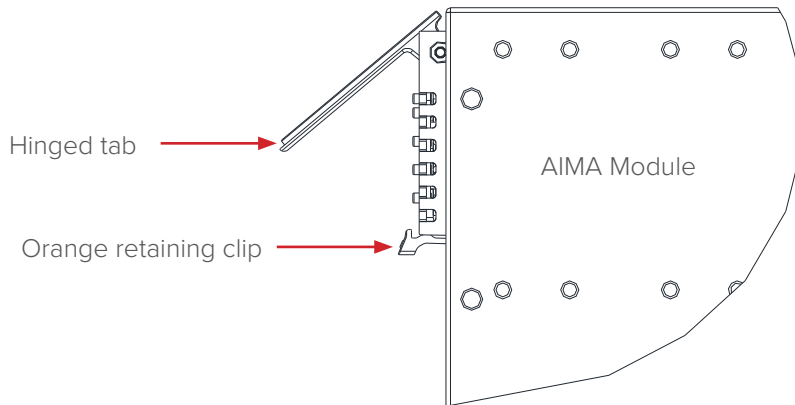
Check the package manifest, record the product module type, serial number, purchase date, and any other relevant information to facilitate later management and maintenance.

**Table 5.2 Packing Manifest**

No.	Description	Qty
1	RT5S module	1
1	Individual test sheet (Certificate of Performance)	1

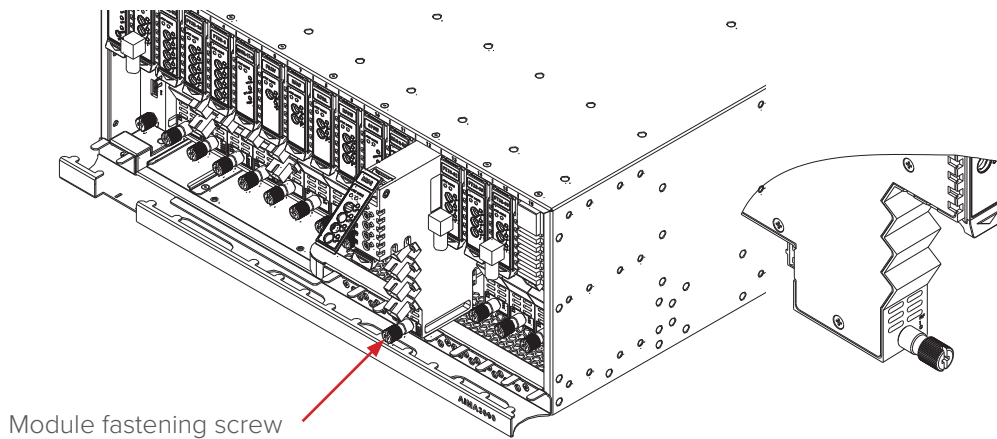
### 5.3 Module Installation

1. Gently depress the orange retaining clip and release the hinged tab



2. Hold the AIMA module casing upright, align it with the AIMA3000 slide rails for the correct slot, and insert the module until it reaches the multi-pin connector.

**DO NOT** use excessive force when inserting the module, but ensure the RF connectors at the rear of the module are securely connected with the chassis's RF connectors.



**CAUTION!**

The module **MUST** be installed correctly to ensure a proper connection of the module's multi-pin connector and the backplane.

**Tip:**

When inserting the module into the guide rails, vertically tilt the module slightly to check that the guides are properly seated on the rails. The module is guided to the correct position using the large metal fastening screw on the lower part of the front panel.

3. After the module is inserted, gently push the hinged tab until it snaps into the orange retaining clip. While pushing down on the hinged tab, the AIMA module will mate with the power bus and will lock in into the chassis

**CAUTION!**

If force is required to insert a module, then it may not be correctly seated on the slide rails, or the mounting screw may be misaligned.

4. When the module is fully seated within the chassis, on the bottom of the AIMA module, fasten the spring-loaded mounting screw. Only use fingers to fasten the mounting screw. DO NOT use a screwdriver.

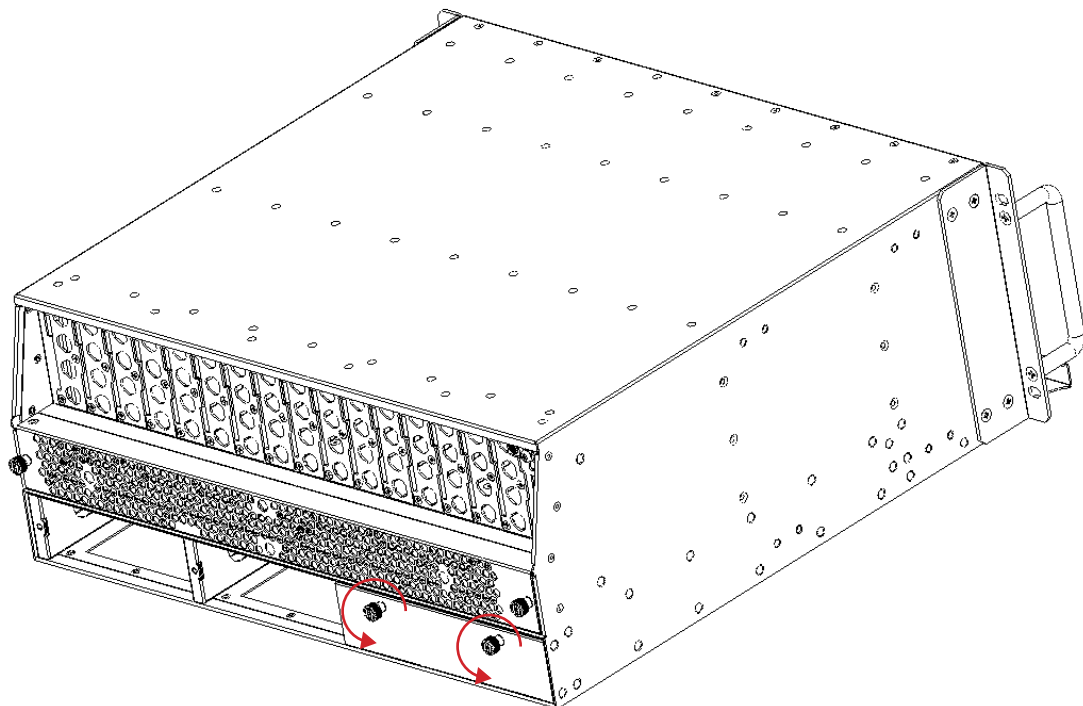
**5.4 Connecting Optical Cables**

For the convenience of the user, the AIMA3000 Chassis has a Sliding Fibre Guide to help the operator to arrange the cables. For the specific steps to connect the fibre, please refer to the instructions in section 5.4.1.

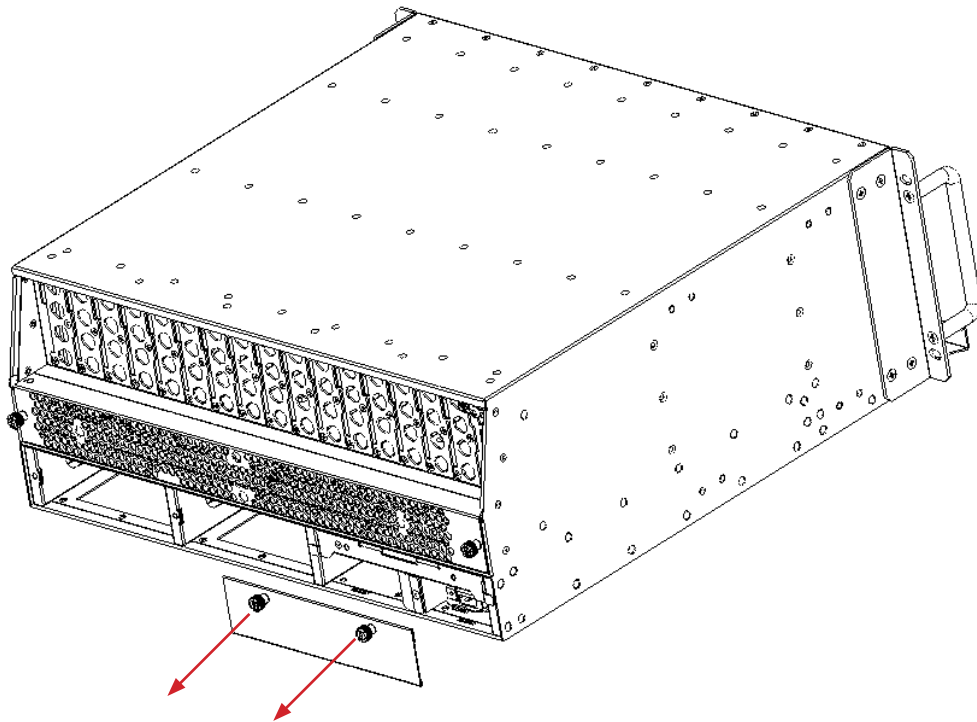
**5.4.1 Using the Sliding Fibre Guide**

The sliding fibre guide is located in the lower-left corner of the chassis if looking at the front of the chassis, and is designed to help installation of the optical fibre cabling. To access the sliding fibre guide you will need to first remove the rear panel located on the back of the chassis.

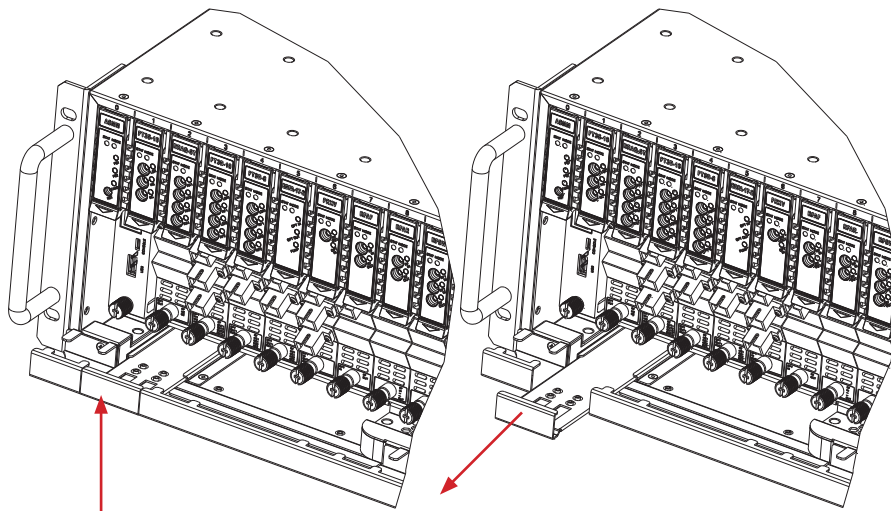
1. Unscrew the two thumbscrews on the rear panel.



2. Then, pull the panel forward.

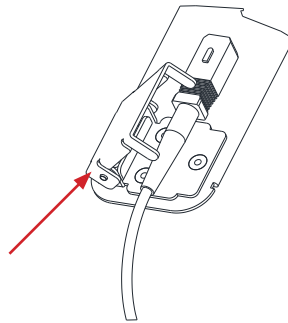


3. Then lift up the handle and slide the fibre guide out of the front of the chassis.



**DO NOT** remove the dust cap from the fibre connector until right before connecting it to the input port.

4. Raise the clip, insert the fibre connector, and then lower the clip over the connector.



When using the sliding guide, put the fibre connector in the clip and slide it in from the rear to the front, through the chassis. Ensure that the optical fibre tail does not become trapped or pulled tightly.



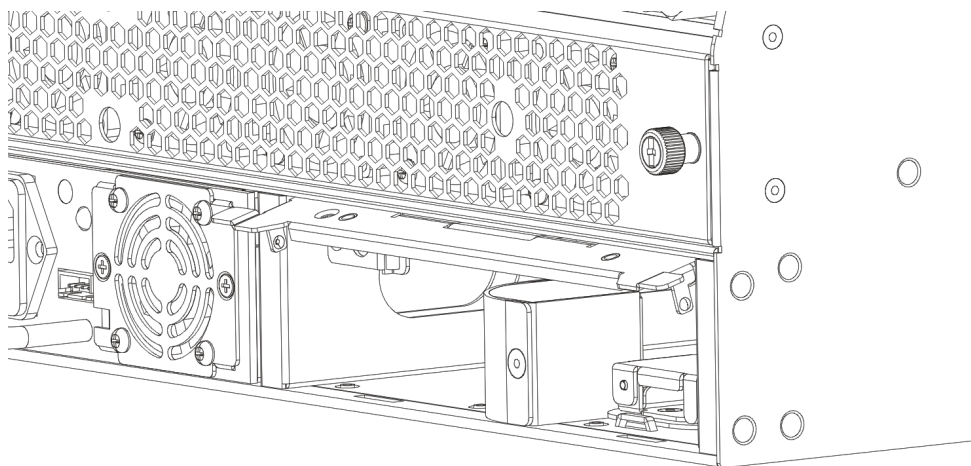
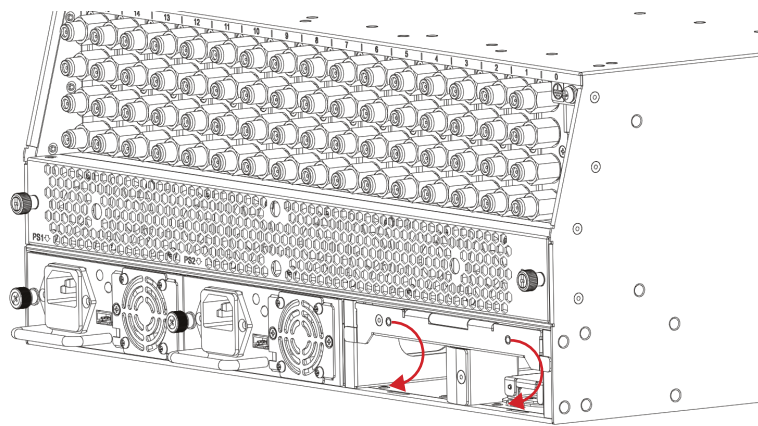
Fibre clip (at rear, for up to two connectors)

Handle (at front)

### 5.4.2 Using the Fibre Tray

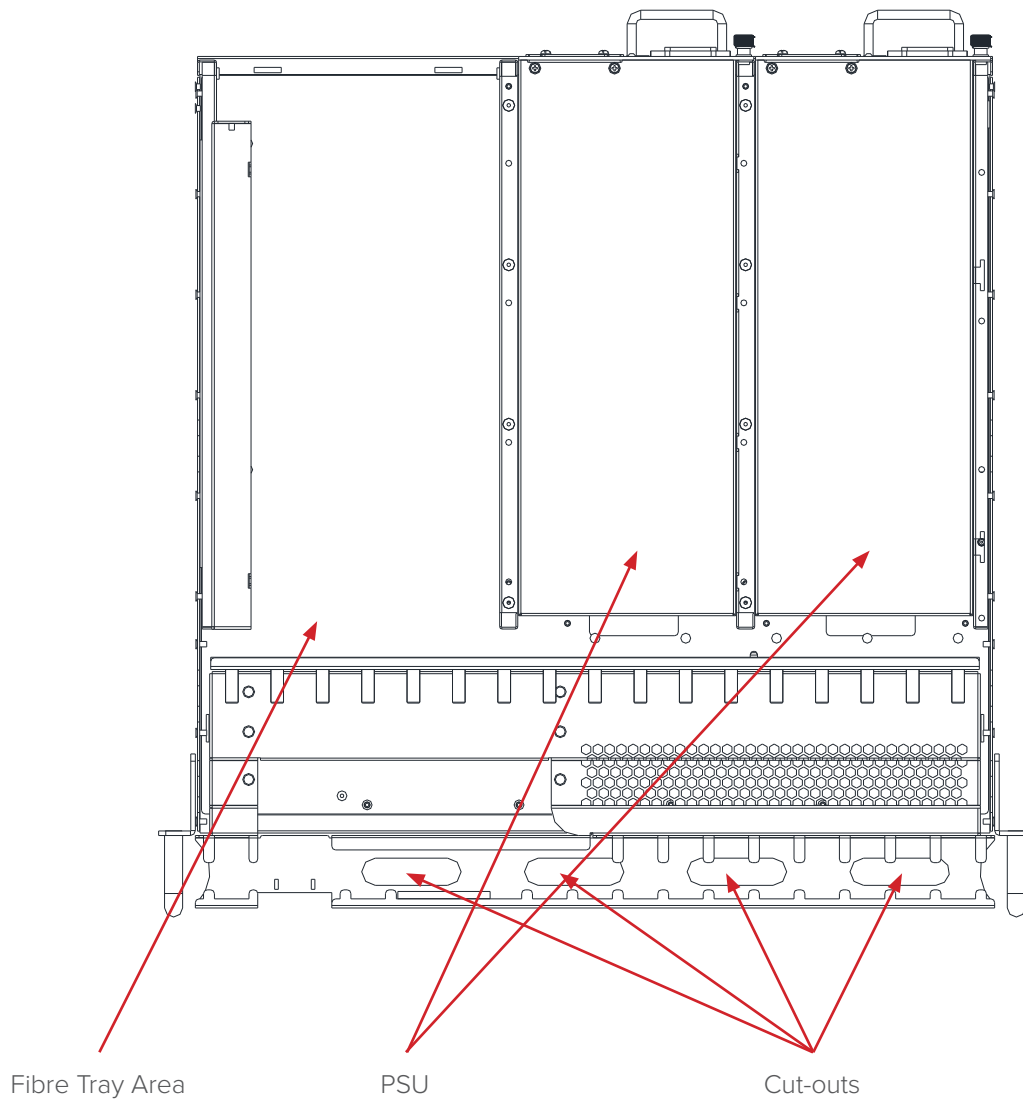
All optical fibres must be organised in a tidy manner in the chassis's fibre tray, which provides enough space for up to 64 optical fibres. This allows for easy positioning and future replacement of optical fibres. Along the front of the chassis, there are cut-outs for keeping the optical fibres in position.

1. When organising the optical fibres, lift up the metal flap at the rear of the panel above the sliding guide. This will allow fibre cables to be moved away from the sliding guide rails.



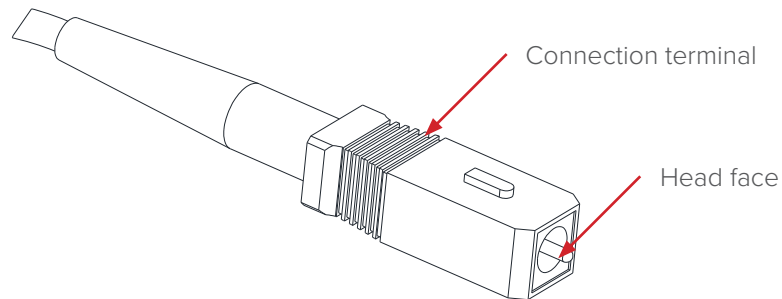


2. Use the Fibre Guide Tool to organise the cables and wires in the fibre tray to prevent tangles and the blocking of the guide rails.



### 5.4.3 Cleaning the Fibre Connector Ends and Front-panel Optical Ports

To obtain a good quality optical input signal, optical fibre input ports and fibre connector ends must be carefully cleaned.



When cleaning the optical fibre-connector end, remove the dust cap and then use a lint-free cloth dampened with a static dissipative solvent to clean the angled surface. Dry the surface using a dry lint-free cloth.

To clean the front-panel optical port, use a special lint-free swab that is designed for this purpose. Dampen it with a static dissipative solvent. Apply slight pressure to the internal angled surface of the optical port, while rotating the swab 90 degrees back and forth. You may need to remove excess solvent using a dry lint-free swab. Alternatively, a cleaning pen such as the one click cleaner can be used.

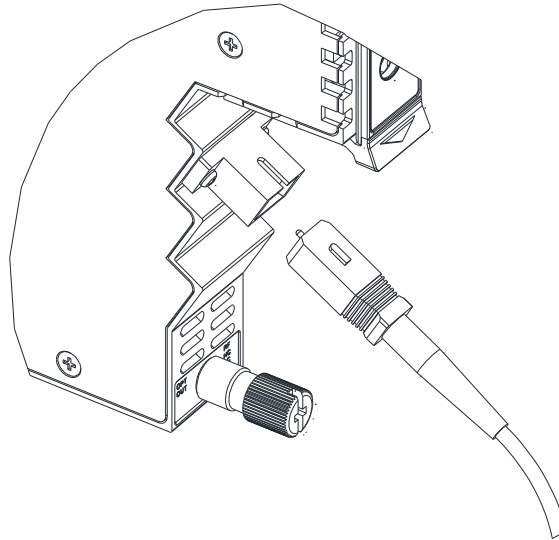
SC one click cleaning pen



[www.oneclickcleaner.com](http://www.oneclickcleaner.com)

#### 5.4.4 Connecting the Optical Fibres

Carefully lift up the hinged cover of the optical input port, align the raised tab on the connector with the slot in the port. Insert the connector until the connector is securely held in place indicated by a clicking sound.



#### 5.5 Check Module LEDs

When the module has been installed, if the chassis is powered, all LED indicators on the front panel will show a blinking green light, indicating the module is initiating. If the input and output signals are normal, the “STAT” LED indicator will cease to blink in about 5 seconds and remain constant green afterwards. At the same time, the “LSR” and “RF” LED indicators will also remain constant green when the signals are normal. If the RF input signal is out of the expected range, the “STAT” and “RF” LED indicator will show constant orange or red. If the optical output signal is out of the expected range, the “STAT” and “LSR” LED indicator will show constant orange or red. For more information regarding the LED indicators, please refer to Appendix A.

#### 5.6 Test the RF Input Signal

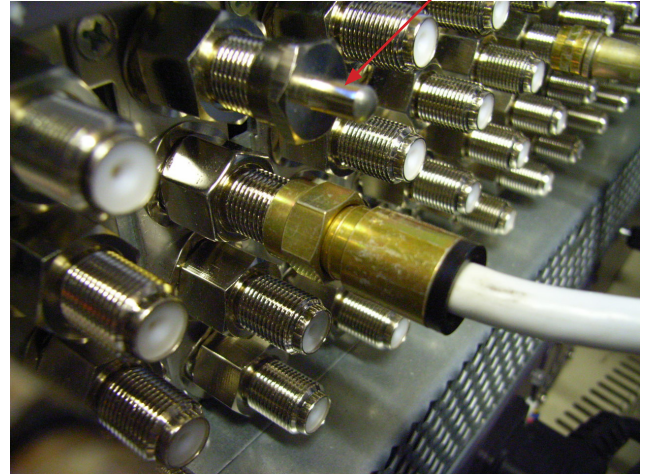
When setting up the transmitter for final deployment, the RF input levels must not exceed 20 dB.

## 5.7 Test the Optical Output Signal

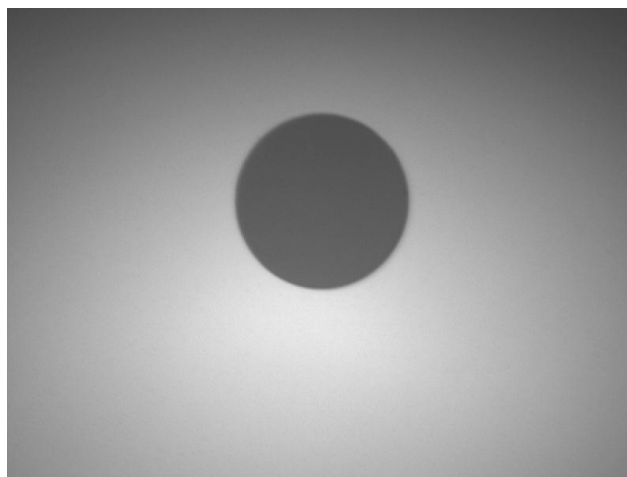
After the input signal has been confirmed, the optical power of the associated optical output port should be tested. Use the optical power meter to test the output levels; the output values should be in accordance with the technical specifications. Before testing, the optical power meter must be calibrated. Before measuring optical signals, verify the interfaces are clean and undamaged.

## 5.8 RT5S Initial Setup

1. Calculate the correct RF drive level per channel for the channel to be used for RF1 and RF2. Confirm RF channel level only on the RF1 and RF2 RF input leads or on all four RF1 and RF2 RF input leads and connect them to the chassis (pictured below). Note: If an RF port is not in use, install an “F” 75  $\Omega$  terminator to the unused connection.



2. Before installing the RT5S, check the optical output ferrule tip with a fibrescope to ensure that the connector is clean (pictured below). The cap on the optical output connector does not prevent contamination from getting on to the optical connector, it prevents the laser from being emitted when laser is on and no optical patch cord is installed.



3. Next, install the RT5S unit into a slot where the RF1 / RF2 input leads are connected and check the optical output power with a cleaned optical patch cord and a calibrated optical power meter. Record the optical output level. Connect a cleaned patch cord to the fibre output and to the relevant optical distribution frame (ODF) panel.

- With a computer connected to the ASMM module’s network, select the port for the transmitter that needs to be adjusted. Select "**Port 1**" for RF1 and "**Port 2**" for RF2 from the left bar under the RT5S being configured. Confirm that the "**Input AGC mode**" is set to "**OFF**", if not change it to "**OFF**" and then click on "**Submit**" button. In addition, confirm that the "**RF-1**" and "**RF-2**" fields are set to 0.0, if not set to 0.0 and click on "**Submit**" button.

Configuration			
Laser Output Control	<input type="button" value="On ▼"/>	Input AGC Mode	<input type="button" value="Off ▼"/>
OMI Offset	<input type="text" value="0.0"/> (-3.0-3.0)dB	RF MGC	<input type="text" value="0.0"/> (-10.0-5.0)dB
			<input type="button" value="Submit"/>

- Confirm in the management "**Status**" section that the RF levels and the RF Composite Input Power are within the designated parameters. If both RF1 and RF2 inputs are used "**Port 1**" and "**Port 2**" pages need to be checked on the web interface.

Status			
Laser Type:	Cooled DFB	Laser Wave Length:	1554.13nm
Laser Output Status:	On	Laser TEC Current:	141mA
		AGC Point:	0.0dB
RF Input Power:	Low	Laser RF Input Power:	94.5dBμV

- Confirm that the "**Alarm Control**" are enabled. Check the required selection and click on "**Submit**" to enable/disable alarms.

**Alarm Settings**

Laser Output Status Alarm enableMajor ▾

Parameter	Current Value	HiHi	Hi	Lo	LoLo	Deadband
RF Input Power(dBμV)	Low	<input type="checkbox"/> 118.8	<input type="checkbox"/> 113.8	<input type="checkbox"/> 78.8	<input type="checkbox"/> 73.8	1.0
Laser Temperature(°C)	22.5	<input checked="" type="checkbox"/> 60.0	<input checked="" type="checkbox"/> 40.0	<input checked="" type="checkbox"/> 15.0	<input checked="" type="checkbox"/> -15.0	0.5
Laser Bias Current(mA)	59	<input type="checkbox"/> 120	<input checked="" type="checkbox"/> 115	<input checked="" type="checkbox"/> 20	<input checked="" type="checkbox"/> 15	2
Laser Output Power(dBm)	10.1	<input checked="" type="checkbox"/> 16.0	<input checked="" type="checkbox"/> 13.0	<input checked="" type="checkbox"/> 7.0	<input checked="" type="checkbox"/> 4.0	0.5

Alarm Control	Factory Default Setting (bold) and range if applicable
Laser Output Status Alarm	Enable Major Enable Minor Disable

## 6 Module Configuration & Alarm setup

The module configuration settings can be configured using the web interface and Technetix NMSE (network management software). This manual only provides details on the web interface. For login details and network setup, please refer to the AIMA-ASMM user manual. If the same module is reinserted in the same slot, the ASMM will restore the previous settings if the module is set to “Auto Download” the configuration.

### 6.1 Alarms Monitoring

All alarm information is monitored by the ASMM module. If an alarm occurs, the operator can view the associated module page to find more detailed alarm information.

#### 6.1.1 Alarm Status Pages

Click the Alarms tab on the menu bar to display an overview of the alarm status of all the installed modules as shown in Figure 6-1 below.

The each module row has an alarm status indicator used to show:

- Normal operation: Green
- Alarms: Red

System	Modules	Alarms	Logs	Upgrade
<b>All Modules</b>				
0	ASMM-A	0	ASMM-A	●
1	FPAS 77CH analog	1	FPAS-S	●
2	FPAS 歌华 signal	2	FPAS-S	●
3	FPAS QAM signal	3	FPAS-S	●
4	RFSW A-77CH B-歌华	4	RFSW	●
5	RFSW A-2.0 B-3.0	5	RFSW	●
6	FT3S-D-10	6	FT3S-D-10	●
7	FT5S-D-10	7	FT5S-D-10	●
8	FT5S-D 1-CMTS 2-QAM	8	EDFA-1-15-G	●
9	EDFA-1-15-G	9	OPSW	●
10	OPSW 1-1550 2-1310	10	RRAS-Q	●
11	RRAS-Q 2-2.0 3-3.0	11	RT5S-D-10	●
12	RT5S-D 1-2.0 2-3.0	12	RPAS-D	●
13	RPAS-D 1-2.0 2-3.0	13	RRAS-Q	●
14	RRAS-Q 2-2.0 3-3.0	14	FRAS-S	●
15	FRAS-S	15	RFSW	●
16	RFSW	16	FT5E-S-10	●
PS1	PS1	PS1	--	--
PS2	PS2	PS2	PS	●
FAN	FAN	FAN	FAN-A	●

Figure 6.1



### 6.1.2 Module operating voltage and temperature alarm

Click on the corresponding module, as shown in the following figure, to view the module alarm information. By clicking on **“RT5S”**, under **“Modules”** tab, the operator can view the module temperature and power supply voltage alarms. The operator can utilise the status indicators to judge whether the module is working properly.

The status has 2 conditions:

- Normal: Green
- Alarms: Red

The screenshot shows a web interface with a navigation menu on the left and a main content area. The navigation menu includes 'System', 'Modules', 'Alarms', 'Logs', and 'Upgrade'. The 'Alarms' tab is active, displaying 'Slot 11 RT5S-D Alarm Status'. A table lists four alarm types with their current values and thresholds. All status indicators are green, indicating normal operation. A 'Refresh' button is located at the bottom right of the table.

No.	Alarm Type	Current Value	HiHi	Hi	Lo	LoLo	Deadband	Status
1	Temperature(°C)	26.0	70.0	65.0	0.0	-5.0	2.0	●
2	+12V Input Voltage(V)	12.2	13.5	--	--	10.5	0.2	●
3	+5V Input Voltage(V)	5.0	6.0	--	--	4.4	0.1	●
4	-5V Input Voltage(V)	-5.0	-4.4	--	--	-6.0	0.1	●

Figure 6.2

Use the status indicators to determine if the module is working properly. If the device is replaced or reset, click on **“Refresh”** to refresh the alarms information.

### 6.1.3 Module Port Alarms

Click on the “Port 1” for RF1 or “Port 2” for RF2 label under the module on the left column, as shown in **Figure 6-3**. On the module port page, the operator can view the Total Input Power, Laser Temperature, Laser Output Power and the Laser bias voltage alarms:

Status has 2 conditions:

- Normal: Green
- Alarms: Red

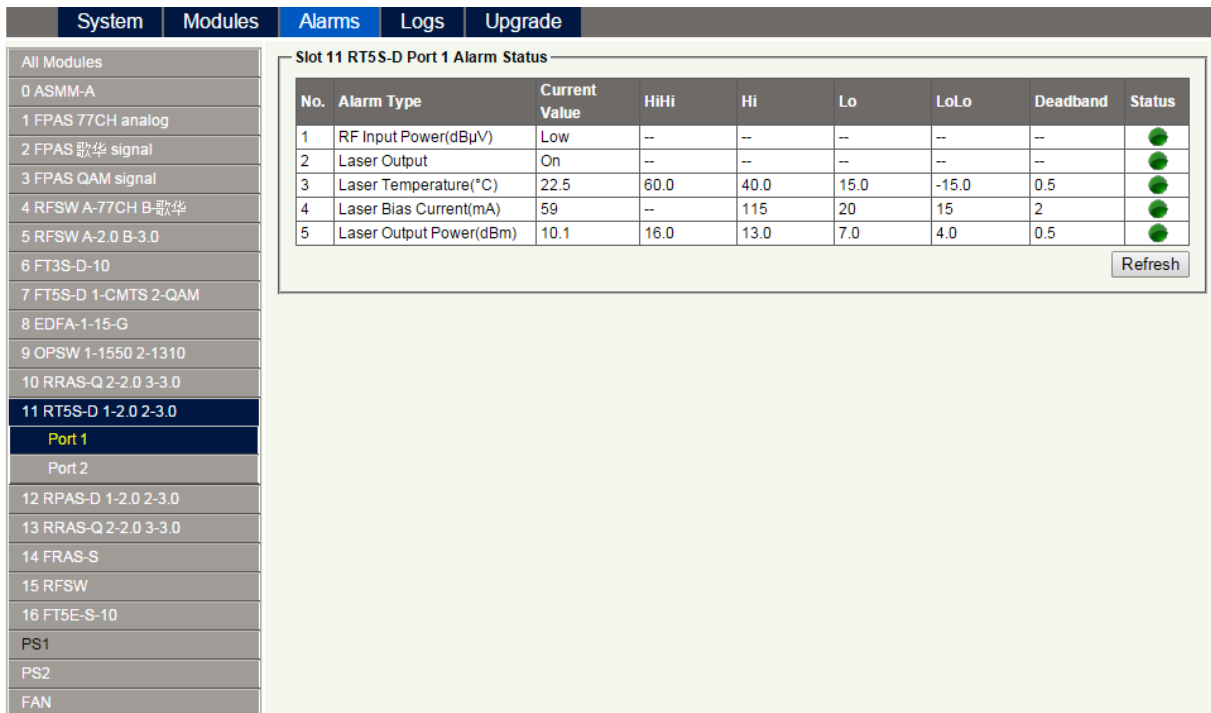


Figure 6.3

### 6.1.4 Alarm Monitoring Configuration

#### Monitoring Function ON / OFF

In Configuration section on Modules page, click Alarm Control to Enable/Disable Monitoring Function.

#### Temperature, +12V, +5V Voltage Alarm Levels Management

By default, temperature, +12 V, +5 V, - 5V voltage alarms are all set to ON. The check box  as shown in **Figure 6-4** controls the detection is set to ON or OFF. When the check box is checked (detection ON), the text in the text box will be solid black. The parameters cannot be changed. The parameters instruction is shown in **Figure 6-4, Table 6-1** below.

The screenshot shows the configuration interface for the RT5S-D 1-2.0 2-3.0 module. It includes sections for Module Information, Configuration, Alarm Settings, and Commands.

Parameter	Current Value	HiHi	Hi	Lo	LoLo	Deadband
Temperature(°C)	26.0	<input checked="" type="checkbox"/> 70.0	<input checked="" type="checkbox"/> 65.0	<input checked="" type="checkbox"/> 0.0	<input checked="" type="checkbox"/> -5.0	2.0
+12V Input Voltage(V)	12.2	<input checked="" type="checkbox"/> 13.5	--	--	<input checked="" type="checkbox"/> 10.5	0.2
+5V Input Voltage(V)	5.0	<input checked="" type="checkbox"/> 6.0	--	--	<input checked="" type="checkbox"/> 4.4	0.1
-5V Input Voltage(V)	-5.1	<input checked="" type="checkbox"/> -4.4	--	--	<input checked="" type="checkbox"/> -6.0	0.1

Figure 6.4

Table 6 1 Modules Page Alarms Threshold Parameters Instruction

Parameter	Units	HIHI	HI	Normal	LO	LOLO	DeadBand	Threshold changeable by user	Default Alarm Enable
Temperature	oC	70	65	-	0	-5	2	N	ON
+12V Input voltage	Vdc	13,5	-	12	-	10,5	0,2	N	ON
+5V Input voltage	Vdc	6	-	5	-	4,4	0,1	N	ON
-5V Input voltage	Vdc	-4,4	-	5	-	-6	0,1	N	ON

### 6.1.5 Input / Output Status Monitoring

To setup Input / Output status monitoring, select the either “Port 1” for RF1 or “Port 2” for RF2 from the left menu under the RT5S needing configuration, and then the monitoring parameters will be listed for the designated transmitter under the “Alarm Settings” section, click on  to toggle the alarms. The customer can change the monitoring parameters. When the parameters are checked they can bet edited. When they are unchecked they cannot be changed, Both transmitters have independent settings and they need to be adjusted separately. See Figure 6-5.

The screenshot shows the configuration interface for the RT5S module. The left-hand menu lists various modules, with 'Port 1' selected. The main configuration area is divided into several sections:

- Port Information:** Slot 11, Module Type: RT5S-D, Port: 1. Includes a 'Refresh' button.
- Status:** Laser Type: Cooled DFB, Laser Wave Length: 1554.13nm, Laser Output Status: On, Laser TEC Current: 141mA, AGC Point: 0.0dB, RF Input Power: Low, Laser RF Input Power: 94.5dBuV.
- Configuration:** Laser Output Control: On, Input AGC Mode: Off, OMI Offset: 0.0 (-3.0-3.0)dB, RF MGC: 0.0 (-10.0-5.0)dB. Includes a 'Submit' button.
- Alarm Settings:** Laser Output Status Alarm: enableMajor. Contains a table of monitoring parameters.

Parameter	Current Value	HiHi	Hi	Lo	LoLo	Deadband
RF Input Power(dBuV)	Low	<input type="checkbox"/> 118.8	<input type="checkbox"/> 113.8	<input type="checkbox"/> 78.8	<input type="checkbox"/> 73.8	1.0
Laser Temperature(°C)	22.6	<input checked="" type="checkbox"/> 60.0	<input checked="" type="checkbox"/> 40.0	<input checked="" type="checkbox"/> 15.0	<input checked="" type="checkbox"/> -15.0	0.5
Laser Bias Current(mA)	59	<input type="checkbox"/> 120	<input checked="" type="checkbox"/> 115	<input checked="" type="checkbox"/> 20	<input checked="" type="checkbox"/> 15	2
Laser Output Power(dBm)	10.1	<input checked="" type="checkbox"/> 16.0	<input checked="" type="checkbox"/> 13.0	<input checked="" type="checkbox"/> 7.0	<input checked="" type="checkbox"/> 4.0	0.5

Figure 6.5

Parameters	Units	Critical High (HiHi)	Warning High (Hi)	Normal	Warning Low (Lo)	Critical Low (LoLo)	Dead Band	Threshold changeable by user	Default Alarm Enable
RF-1 Input power	dBmV	58,4	53,4	-	18,4	13,4	1	Y	OFF
Laser Temperature	oC	60	40	-	15	-15	0,5	Y	ON
Laser Bias Current	mA	120	115	-	20	15	2	Y	ON
Laser Output Power	dBm	16	13	10	7	4	0,5	Y	ON

Table 6 2 Module Alarm Indicator Definitions

Parameters (Common)	Description	Definitions	Related Indicators	LED Indicators
Power OFF	Power OFF	Power OFF	All	All OFF
Initiating AM	Power ON	During Module Power ON	All	Green (2 times / sec)
No Alarm	Normal operation	Normal	All	Green
AM-Critical-ALM	Critical Alarm		STAT	Red
AM-Warning-ALM	Warning Alarm		STAT	Amber
Input AGC Mode	AGC / MGC Mode Control		MODE	OFF (either port1 or port2) Blinking, ON (both port1 and port2) Green always
RF-1-Critical-ALM	RF Input Power is too high (HiHi) or too low (LoLo). ("RF Input Power" click on <input checked="" type="checkbox"/> in "Alarm Settings" section)		STAT RF1 IN	Red
RF-1-Warning-ALM	RF Input Power is higher (Hi) or lower (Lo). ("RF Input Power" click on <input checked="" type="checkbox"/> in "Alarm Settings" section)		STAT RF1 IN	Amber
RF-2-Critical-ALM	The same as MRF-1-Critical-ALM"F		STAT RF2 IN	Red
RF-2-Warning-ALM	The same as "RF-1-Warning-ALM"F		STAT RF2 IN	Amber
Laser1-Critical-ALM	Laser Temperature is too high (HiHi) or too low (LoLo).		STAT LSR1	Red
	Laser Bias Current is too high (HiHi) or too low (LoLo).			
	Laser Output Power is too high (HiHi) or too low (LoLo).			

Parameters (Common)	Description	Definitions	Related Indicators	LED Indicators
<b>Laser1-Warning-ALM</b>	Laser Temperature is higher (Hi) or lower (Lo).		STAT LSR1	Amber
	Laser Bias Current is higher (Hi) or lower (Lo).			
	Laser Output Power is higher (Hi) or lower (Lo).			
<b>Laser1-Output-Major-ALM</b>	“Laser Output Status Alarm ”is set to “enableMajor”	Laser1-Shutdown	STAT LSR1	Red
<b>Laser1-Output-Minor-ALM</b>	“Laser Output Status Alarm ”is set to “enableMinor”	Laser1-Shutdown	STAT LSR1	Amber
<b>Laser2-Critical-ALM</b>	The same as MLaser1-Critical-ALM”		STAT LSR2	Red
<b>Laser2-Warning-ALM</b>	The same as “Laser1-Warning-ALM”		STAT LSR2	Amber
<b>Laser2-Output-Major-ALM</b>	The same as “Laser1-Output-Major-ALM”	Laser2-Shutdown	STAT LSR2	Red
<b>Laser2-Output-Minor-ALM</b>	The same as “Laser1-Output-Minor-ALM”	Laser2-Shutdown	STAT LSR2	Amber

## 6.2 Logs Management

The operator can view all the alarms of the modules in the chassis on the Logs Management page. Click “**Logs**” to enter the Logs Management page. Refer to **Figure 6.6** below:

System	Modules	Alarms	Logs	Upgrade			
<b>All Logs</b>							
No.	Slot	Port	Type	Alarm Value	State	Time	Content
1	7	2	RF Input Power	81.4dBμV	Lo	2016-05-17 15:57:58	BC Input Power Alarm
2	7	1	RF Input Power	79.7dBμV	Lo	2016-05-17 15:57:57	BC Input Power Alarm
3	6	2	RF Input Power	80.3dBμV	Lo	2016-05-17 15:57:56	BC Input Power Alarm
4	6	1	RF Input Power	79.8dBμV	Lo	2016-05-17 15:57:56	BC Input Power Alarm
5	14	1	Output Power	104.3dBμV	Lo	2016-05-17 15:57:53	RF Output Power Alarm
6	7	2	RF Input Power	78.1dBμV	LoLo	2016-05-17 15:48:17	BC Input Power Alarm
7	7	1	RF Input Power	76.6dBμV	LoLo	2016-05-17 15:48:17	BC Input Power Alarm
8	6	2	RF Input Power	77.1dBμV	LoLo	2016-05-17 15:48:16	BC Input Power Alarm
9	6	1	RF Input Power	77.0dBμV	LoLo	2016-05-17 15:48:16	BC Input Power Alarm
10	7	2	RF Input Power	80.6dBμV	Lo	2016-05-17 15:48:03	BC Input Power Alarm
Total Pages: 3    Current Page: 1 <a href="#">First Page</a> Page Up    Page Down <a href="#">Last Page</a> Goto: <input type="text" value="1"/> <input type="button" value="Delete All"/>							

Figure 6.6

### 6.3 Device Upgrade

The module supports firmware upgrade function.

To upgrade the firmware, first upload the local upgrade file, and then click **"Start Upgrade"** to begin with the upgrade process. At the same time, you will be automatically redirected to the Network Management page. The upgrade operation is then completed.

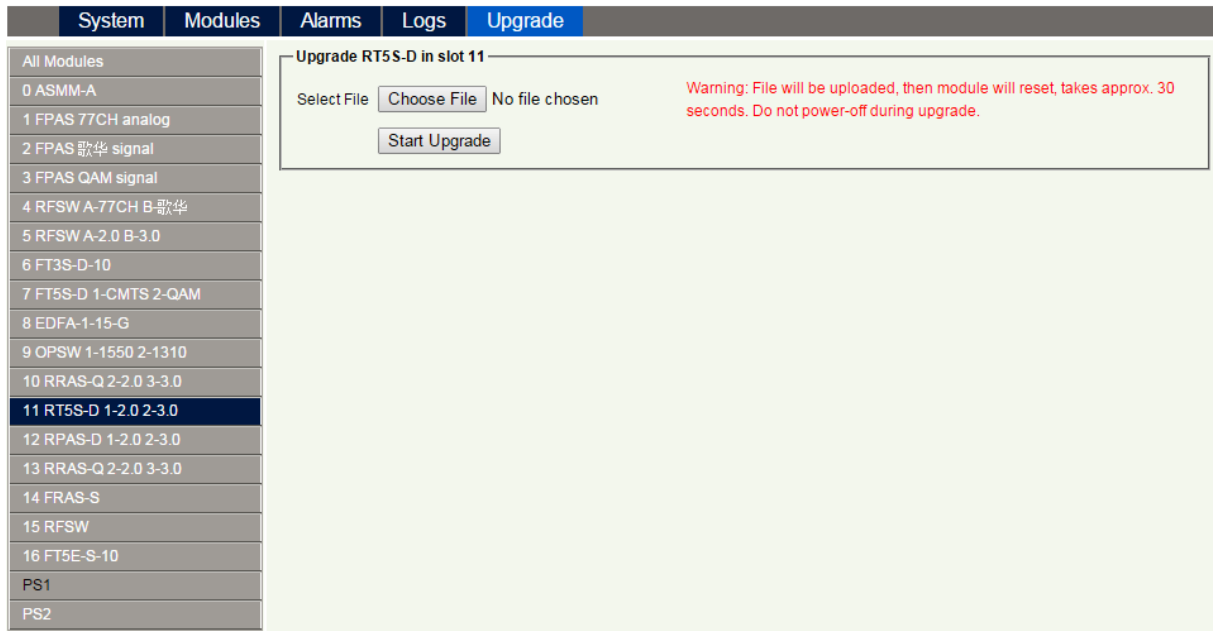


Figure 6.7

- The upgrade file needs to be located in the PC that is connecting to ASMM
- The Web GUI above only supports the manual operation from a local PC.
- The RT5S supports automated firmware updates and automatic backup & restore features via TFTP when managed via Technetix NMSE management software. Please refer to the NMSE Product User Manual for more information.



### 6.4 Restoring Factory Defaults

Loading factory default can restore the device to the factory default setting.

#### Detailed operations:

Click Modules tab and click the module to be configured as the page shown in **Figure 6-8** and **Figure 6-9**. Click "Apply" button in Factory Default section. When finished, the device configuration will be reset. For more detailed factory reset information, please refer to the factory restore and upgrade configuration parameters table shown in **Table 6-3**.

System	Modules	Alarms	Logs	Upgrade		
<b>All Modules</b>						
0 ASMM-A	Slot 0	Module Type ASMM-A	Hotswap Mode --	Command --	Provisioned Configuration --	Status Sync
1 FPAS 77CH analog	Slot 1	Module Type FPAS-S	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
2 FPAS 歌华 signal	Slot 2	Module Type FPAS-S	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
3 FPAS QAM signal	Slot 3	Module Type FPAS-S	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
4 RFSW A-77CH B 歌华	Slot 4	Module Type RFSW	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
5 RFSW A-2.0 B-3.0	Slot 5	Module Type RFSW	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
6 FT3S-D-10	Slot 6	Module Type FT3S-D-10	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
7 FT5S-D-10	Slot 7	Module Type FT5S-D-10	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
8 EDFA-1-15-G	Slot 8	Module Type EDFA-1-15-G	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
9 OPSW	Slot 9	Module Type OPSW	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
10 RRAS-Q	Slot 10	Module Type RRAS-Q	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
11 RT5S-D 1-CMTS 2-QAM	Slot 11	Module Type RT5S-D-10	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
12 RPAS-D 1-2.0 2-3.0	Slot 12	Module Type RPAS-D	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
13 RRAS-Q 2-2.0 3-3.0	Slot 13	Module Type RRAS-Q	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
14 FRAS-S	Slot 14	Module Type FRAS-S	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
15 RFSW	Slot 15	Module Type RFSW	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
16 FT5E-S-10	Slot 16	Module Type FT5E-S-10	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
PS1	PS1	Module Type PS	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status --
PS2	PS2	Module Type PS	Hotswap Mode Manual ▼	Command --	Provisioned Configuration <a href="#">view</a>	Status Sync
FAN	FAN	Module Type FAN-A	Hotswap Mode --	Command --	Provisioned Configuration --	Status Sync

**Note:** Auto Download automatically downloads the last known configuration stored in the A SMM to the application module

Auto Upload automatically uploads the configuration from the application module to the A SMM database

Figure 6.8

#### Note:

All the powers displayed on the webpage are total power.

The screenshot displays the configuration interface for the RT5S-D 1-2.0 2-3.0 module. It is divided into several sections:

- System/Modules:** A sidebar menu on the left lists various modules, with '11 RT5S-D 1-2.0 2-3.0' selected.
- Module Information:** Shows details such as Model (A-RT5S-D-10-2931-S-20), Serial No. (20141023), HW Assembly No. (A04834\_0), FW Part No. (S09187), and FW Version (V01.00.02). A 'Refresh' button is present.
- Configuration:** Includes 'Alarm Control' set to 'Enable' and 'Tx Unit Control' set to 'On'. A 'Module Alias' field contains 'RT5S-D 1-2.0 2-3.0'. A 'Submit' button is at the bottom right.
- Alarm Settings:** A table with columns: Parameter, Current Value, HiHi, Hi, Lo, LoLo, and Deadband.
 

Parameter	Current Value	HiHi	Hi	Lo	LoLo	Deadband
Temperature(°C)	26.0	<input checked="" type="checkbox"/> 70.0	<input checked="" type="checkbox"/> 65.0	<input checked="" type="checkbox"/> 0.0	<input checked="" type="checkbox"/> -5.0	2.0
+12V Input Voltage(V)	12.2	<input checked="" type="checkbox"/> 13.5	--	--	<input checked="" type="checkbox"/> 10.5	0.2
+5V Input Voltage(V)	5.0	<input checked="" type="checkbox"/> 6.0	--	--	<input checked="" type="checkbox"/> 4.4	0.1
-5V Input Voltage(V)	-5.1	<input checked="" type="checkbox"/> -4.4	--	--	<input checked="" type="checkbox"/> -6.0	0.1

 A 'Submit' button is at the bottom right of this section.
- Commands:** Includes 'Factory Defaults' and 'Reboot' buttons, both with 'Apply' sub-buttons. Red warning text is displayed: 'Warning: Applying factory defaults will erase all configuration and restore factory defaults. The module will reboot after applying default values.' and 'Warning: Rebooting the module will take approx. 20 seconds.'

Figure 6.9

Table 6 3 Factory default table

Parameters	Configuration	Factory default value	After upgrade
Alarm Control	Enable/Disable	Enable	Retained
TxUnitControl	ON / OFF	ON	Retained
Laser Output Control	ON / OFF	ON	Retained
Input AGC Mode	ON / OFF	OFF	Retained
RF-1	(-15.0-0.0)	0	Retained
RF-2	(-10.0+5)	0	Retained

### 6.5 Reboot

The module can be made to reboot remotely, shown in Figure 6-10 below.

#### Detailed operations:

Click Modules tab, click the corresponding RT5S module, and click the "Apply" button in Reboot section. Next, click on "Submit" to confirm and then the module will automatically restart. The configuration of the module will not be lost after rebooting.

The screenshot shows the 'Modules' configuration page for the selected module '11 RT5S-D 1-2.0 2-3.0'. The interface is divided into several sections:

- Module Information:**
  - Model: A-RT5S-D-10-2931-S-20
  - Serial No: 20141023
  - HW Assembly No: A04834\_0
  - FW Part No: S09187
  - FW Version: V01.00.02
  - Refresh button
- Configuration:**
  - Alarm Control: Enable (dropdown)
  - Tx Unit Control: On (dropdown)
  - Module Alias: RT5S-D 1-2.0 2-3.0
  - Submit button
- Alarm Settings:**

Parameter	Current Value	HiHi	Hi	Lo	LoLo	Deadband
Temperature(*C)	26.0	<input checked="" type="checkbox"/> 70.0	<input checked="" type="checkbox"/> 65.0	<input checked="" type="checkbox"/> 0.0	<input checked="" type="checkbox"/> -5.0	2.0
+12V Input Voltage(V)	12.2	<input checked="" type="checkbox"/> 13.5	--	--	<input checked="" type="checkbox"/> 10.5	0.2
+5V Input Voltage(V)	5.0	<input checked="" type="checkbox"/> 6.0	--	--	<input checked="" type="checkbox"/> 4.4	0.1
-5V Input Voltage(V)	-5.1	<input checked="" type="checkbox"/> -4.4	--	--	<input checked="" type="checkbox"/> -6.0	0.1

- Submit button

- Commands:**
- Factory Defaults: Apply button. Warning: Applying factory defaults will erase all configuration and restore factory defaults. The module will reboot after applying default values.
- Reboot: Apply button. Warning: Rebooting the module will take approx. 20 seconds.

Figure 6.10

## 7 Troubleshooting

### Indicator for determining faults

If there is a fault, the operator can use the status LEDs to determine the location and condition of the fault. Please see Table 7-1 below:

**Table 7.1 Fault Judgment Table**

Alarm Indicator status	Common Faults	Trouble Shooting
RF1 IN is amber	RF Input Power is higher (Hi) or lower (Lo). ("RF Input Power" click on ☑ in "Alarm Settings" section)	Adjust port1 input signal.
RF1 IN is red	RF Input Power is too high (HiHi) or too low (LoLo). ("RF Input Power" click on ☑ in "Alarm Settings" section)	Adjust port1 input signal.
RF2 IN is amber	The same as RF1 IN is Amber"	Adjust port2 input signal.
RF2 IN is red	The same as rRF1 IN is red"	Adjust port2 input signal.
LSR1 is amber	Laser Temperature is higher (Hi) or lower (Lo).	Check the laser's temperature. If the temperature is normal, please contact Technetix technical support.
	Laser Bias Current is higher(Hi) or lower (Lo).	Check the laser's Bias Current. If the Bias Current is normal, please contact Technetix technical support.
	Laser Output Power is higher (Hi) or lower (Lo).	Check the laser's Output Power. If the Output Power is normal, please contact Technetix technical support.
	Laser is shutdown.("Laser Output Status Alarm "is set "enableMinor")	Turn on the laser.
LSR1 is red	Laser Temperature is too high (HiHi) or too low (LoLo).	Check the laser's temperature. If the temperature is normal, please contact Technetix technical support.
	Laser Bias Current is too high (HiHi) or too low (LoLo).	Check the laser's Bias Current. If the Bias Current is normal, please contact Technetix technical support.
	Laser Output Power is too high (HiHi) or too low (LoLo).	Check the laser's Output Power. If the Output Power is normal, please contact Technetix technical support.
	Laser is shutdown.("enableMajor)	Turn on the laser.

Alarm Indicator status	Common Faults	Trouble Shooting
<b>LSR2 is amber</b>	The same as ILSR1 is Amber”	The same as ILSR1 is Amber” m
<b>LSR2 is red</b>	The same as ILSR1 is red”	The same as ILSR1 is red” s
<b>STAT is amber</b>	Operating environment Temperature is lower or higher.	Check the fans, or lower the room temperature. If the temperature is normal, please contact Technetix technical support.
	+12V /+5V /-5V Input Voltage is lower or higher.	Please contact Technetix technical support.
	RF input is lower or higher.	Adjust input signal or adjust MGC to an appropriate value.
	Laser Warning ALM or Laser shutdown.(“Laser Output Status Alarm ”is set “enableMinor”)	Check the laser’s status.
<b>STAT is red</b>	Operating environment Temperature is too high or too low.	Check the Fans, or lower the room temperature. If the temperature is normal, please contact Technetix technical support.
	+12V /+5V/-5V Input Voltage too high or too low.	Please contact Technetix technical support.
	RF input power too high or too low.	Adjust input signal or adjust MGC to an appropriate value.
	Laser Critical ALM or Laser shutdown. (“Laser Output Status Alarm ”is set “enableMajor”)	Check the laser’s status.

## 8 Declaration of Conformity

### According to ISO/IEC Guide 22 and EN45014

**Manufacturer's Name:** Technetix

**Manufacturer's Address:** Technetix Ltd, Innovation House, Technetix Business Park,  
Albourne, West Sussex, BN6 9EB

**Product Name:** RT5S – 1550 nm Return Transmitter - Standard

### Conforms to the following standards:

**FCC:** FCC Part 15 Subpart B: 2012

**CE:** EN 50083-2: 2012; EN 5504: 2010; EN 61000-3-2: 2006+A1: 2009+A2: 2009;  
EN55022:2010; EN 61000-3-3: 2008

**RCM:** AS/NZS CISPR22: 2009+A1: 2010 (Pending)



Appendix A: Default Alarm Limit Settings

Parameter	Units	HIHI	HI	Normal	LO	LOLO	DeadBand	Threshold changeable by user	Default Alarm Enable
Temperature	oC	70	65	-	0	-5	2	N	ON
+12V Input voltage	Vdc	13,5	-	12	-	10,5	0,2	N	ON
+5V Input voltage	Vdc	6	-	5	-	4,4	0,1	N	ON
-5V Input voltage	Vdc	-4,4	-	5	-	-6	0,1	N	ON

